

Problem 3.28: Long and Sleepless Nights

Sammy went to lab after a long, sleepless night, and constructed the circuit shown in [Figure 3.70](#). He cannot remember what the circuit, represented by the impedance Z , was. Clearly, this forgotten circuit is important as the output is the current passing through it.

1. What is the Thevenin equivalent circuit seen by the impedance?
2. In searching his notes, Sammy finds that the circuit is to realize the transfer function

$$H(f) = \frac{1}{j10\pi f + 2}$$

Find the impedance Z as well as values for the other circuit elements.

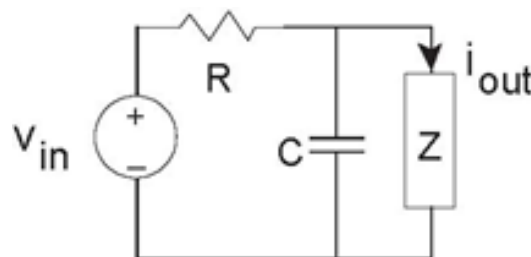


Figure 3.70 Long and Sleepless Nights

Problem 3.29: A Testing Circuit

The simple circuit here ([Figure 3.71](#)) was given on a test.

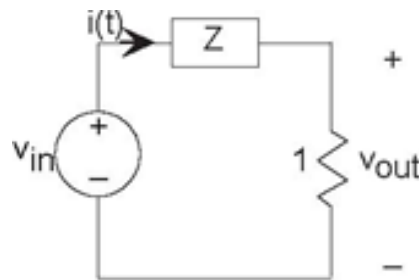


Figure 3.71 A Testing Circuit

When the voltage source is

$$\sqrt{5}\sin(t),$$

the current

$$i(t) = \sqrt{2}\cos(t - \arctan(2) - \frac{\pi}{4})$$

1. What is voltage $v_{out}(t)$?
2. What is the impedance Z at the frequency of the source?